

Gaimardia bahamondei, spec. nov., from Central Chile (Mollusca: Bivalvia: Cyamiidae: Gaimardiinae)

by

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Abstract. The authors describe and illustrate *Gaimardia bahamondei* Osorio & Arnaud, spec. nov., from Isla Santa Maria (latitude 37°5'S; longitude 73°30'W), southeastern Pacific Ocean. Specimens were collected on the red alga *Gracilaria verrucosa* found at depths of 5 m. The new species is compared to those already known in the genus *Gaimardia* and its brooding habit is recorded. A new name is proposed for *G. exilis* H. & A. Adams, 1863, non Philippi, 1858: *G. adamsiorum* nom. nov.

INTRODUCTION

DURING FEBRUARY 1979, the commercial exploitation of seaweeds was hampered on the coasts of central Chile by a small prolific bivalve growing on the red alga *Gracilaria verrucosa*. The bivalve accounted for 20 and 52.3% of the total biomass harvested during February and September, respectively, around Isla Santa Maria.

The resulting lowering of the value of the algae drew our attention to this bivalve that we have identified as a new representative of the genus *Gaimardia* Gould, 1852, a genus characteristic of the southern oceans (ARNAUD, 1974). This bivalve is here described as *Gaimardia (Gaimardia) bahamondei* Osorio & Arnaud, spec. nov.

Bivalvia Linné, 1758

Cyamiacea Philippi, 1845

Cyamiidae Philippi, 1845

Gaimardia Gould, 1852

Gaimardia (Gaimardia) bahamondei

Osorio & Arnaud, spec. nov.

(Figures 1 to 5)

Description—shell morphology: Shell small (maximum length 7.7 mm), sub-ovate to sub-trapezoidal (Figures 1, 2), convex, thin, delicate, equivalve, and inequilateral. Beaks prosogyrate, prominent, anteriorly placed, and ad-

jacent. Periostracum salmon red, some individuals lighter red to white.

Anterior margin slanting, merging smoothly into the ventral margin through a blunt rostrum. Posterior margin uniformly rounded. Dorsal margin nearly straight. Ventral edge almost straight, sometimes with slight undulation at the point where byssus emerges. Without byssal gap, or with very narrow one.

Outer surface smooth, with tenuous and regular microscopic growth lines.

Hinge plate narrow. Two cardinal teeth on the right valve: the dorsal tooth triangular (Figure 3B) and the ventral tooth cylindrical and projecting (Figure 3A). Left valve with one cardinal tooth, elongated, wavy, anterior end rounded, fitting between teeth on right valve. Ligament dorsal, partially sunken, long, narrow, beginning behind the umbo (Figure 3).

Inner surface smooth, with faint muscle scars. Adductor scars slightly unequal: the anterior scar elongate, sub-oval, tapering to a pointed upper tip; the posterior scar less elongate and rounded. Anterior retractor muscle scar small, located close to upper edge of anterior adductor scar; posterior retractor scar coalesced with posterior adductor (Figure 4).

Description—anatomy: Mantle thin, transparent, smooth, and thickened at the edges which are joined by a membrane leaving three openings: anterior or pedal opening

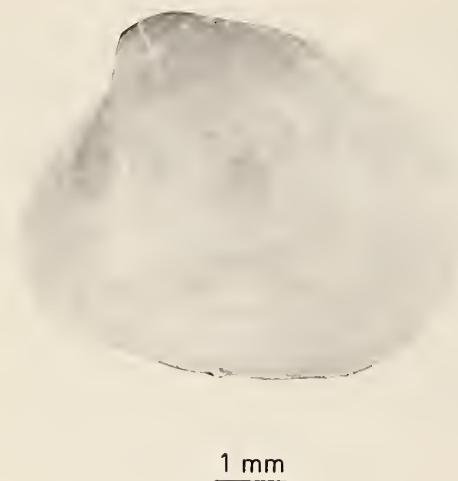


Figure 1

Gaimardia bahamondei Osorio & Arnaud, spec. nov.

medium sized; median or branchial opening almost twice as long as pedal opening; and posterior or anal opening about half as long as pedal opening (Figure 4). Sutures between these three openings are subequal in length.

Gills large, unequal, developed on both sides. Outer demibranch, elongate dorso-ventrally, and having a pointed posterior tip (Figure 4). Inner demibranch sub-quad-rangular, nearly twice the size of the outer. Demibranchs joined posteriorly, anterior edges free. Both demibranchs are used for incubation of the eggs and juveniles.

Foot moderately developed, linguiform, directed anteriorly (Figure 4). The byssal gland is open at its posterior part, the byssus being formed by few very thin, translucent white fibers.

The anatomy of *Gaimardia* was studied or discussed, mostly in *G. trapesina* (under various names), by J. E. GRAY (1854), M. E. GRAY (1857), PELSENER (1903), IGEL (1908a, b), ODHNER (1924), and PONDER (1971). The anatomy of the new species is in general agreement with that previously described in these other representatives of the genus.

Type locality: Chile, Isla Santa Maria (37°5'S; 73°30'W) in the Golfo de Arauco, near Concepcion, 4.5 to 5 m deep, on the red alga *Gracilaria verrucosa* (Hudson), March 1979.

Type material: **Holotype**—6.7 mm long × 5.0 mm high. Museo Nacional de Historia Natural, Santiago de Chile. No. ML 100244.

Paratypes—12 specimens 2.6–6.0 mm long, Museo Nacional de Historia Natural, Santiago de Chile, No. ML 100235. Other paratypes are deposited in Museum National d'Histoire Naturelle, Paris, France; U.S. National Museum, Washington, U.S.A.; Los Angeles County Museum, U.S.A.; and British Museum (Natural History), London, U.K.

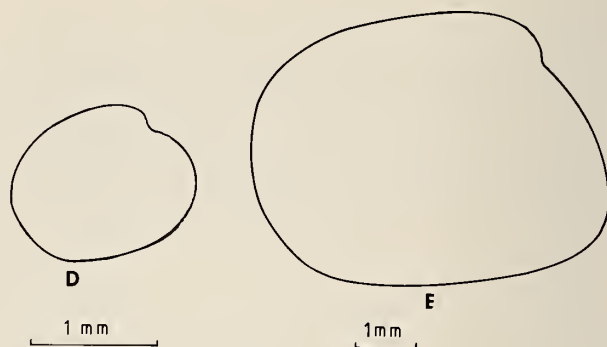


Figure 2

Variation of the outline of *Gaimardia bahamondei*, from sub-oval (D) to sub-trapezoidal (E), during its growth.

Etymology: This new species is kindly dedicated to Professor Nibaldo Bahamonde, investigator at the Museo Nacional de Historia Natural and Professor at the Universidad de Chile, in recognition of his work.

Biological notes: The size of specimens we have examined varies from 1.3 mm long × 1.1 mm high to 7.7 mm long × 6.0 mm high. The specimens tend to become trapezoidal in outline as their size increases (Figure 2). The size structure of the population (Figure 5) indicates the presence of juveniles (less than 4 mm in length) and adults between 4 and 7 mm long; adults account for about 75 per cent of the population.

Individuals are reproductive from 4 to 7 mm in length. In the inner demibranchs, we counted as many as 949 broods in a single female 7 mm long. The size of broods varies between 130 and 430 μm . A similar brooding habit is well known in the *Macrocystis*-associated *G. trapesina*.

Status of the subfamily Gaimardiinae: The genus *Gaimardia* was formerly considered as part of the family Gaimardiidae among the superfamily Gaimardiacea (see FLEMING, 1969). PONDER (1971) has shown that it is preferable to regard this family as a subfamily in the Cyamiidae of the superfamily Cyamiacea. This proposal has been recently questioned by MORTON (1979), but we accept it until more evidence is available.

Among the genus *Gaimardia*, three subgenera may be distinguished: the primitive subgenera *Neogaimardia* Odhner, 1924 (see MORTON, 1979) and *Progaimardia* Ponder, 1971, and the more evolved subgenus *Gaimardia* (s.s.).

Comparisons of *G. bahamondei* with other species: Our material from Isla Santa Maria was compared to the various representatives of the genus *Gaimardia* and related genera. This was done on the basis of examination of type material preserved in the Museum National d'Histoire Naturelle, Paris (types of Rochebrune and Mabilie) and in the British Museum (Natural History), London (types

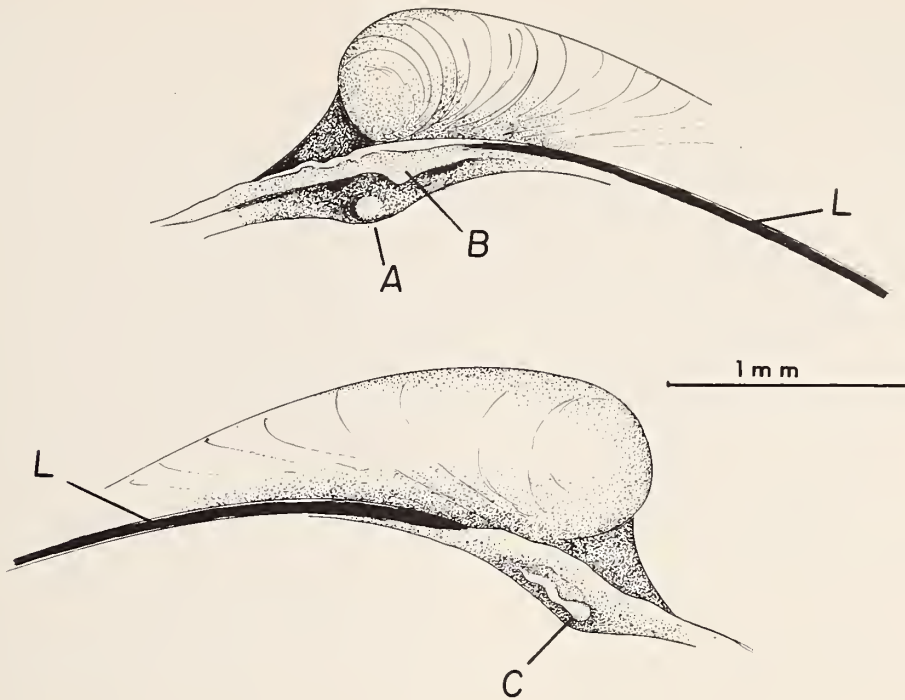


Figure 3

Gaimardia bahamondei Osorio & Arnaud, spec. nov., hinge region of both valves. Right valve: A, dorsal cardinal tooth; B, ventral cardinal tooth; L, ligament. Left valve: C, cardinal tooth; L, ligament.

of H. & A. Adams and Preston); we compared these types to recent samples from Kerguelen and Crozet Islands. It is obvious that the species from central Chile does not belong to the primitive subgenera *Neogaimardia* Odhner, 1924 (see MORTON, 1979) or *Progaimardia* Ponder, 1971, both having well developed hinges. *Gaimardia bahamondei* Osorio & Arnaud, spec. nov., is a member of the subgenus *Gaimardia* (s.s.) and more-or-less intermediary in all its characteristics between *Gaimardia* (*Gaimardia*) *exilis* (H. & A. Adams, 1863) and the much more-evolved *Gaimardia* (*G.*) *trapesina* (Lamarck, 1819).

Coincidentally we must rename this *Gaimardia exilis* (H. & A. Adams, 1863): another species, *Phaseolicama exilis* Philippi, 1858, has to be accepted into the genus *Gaimardia* (because *Phaseolicama* Rousseau, 1854, is a junior synonym of *Gaimardia* Gould, 1852: see, for example, FLEMING, 1969). So we propose to rename *Gaimardia exilis* H. & A. Adams non Philippi: *Gaimardia adamsiorum*, nom. nov.

The species from central Chile may be distinguished from *Gaimardia adamsiorum*, nom. nov. (redescribed and figured by SMITH, 1877, and PONDER, 1971, and available to us from the Falkland Islands as type material, and from the Kerguelen Islands) by several characters: *G. bahamondei* has a blunt rostrum, a thin shell, comparatively small cardinal teeth (however, they become more and more

indistinct with age in *G. adamsiorum*), and lacks lateral teeth.

Gaimardia trapesina is a variable species that has received many names (see, for example, DELL, 1964), including the following based on material from southern South America or South Georgia Island: *Phaseolicama magellanica* Rousseau, 1854; *Modiolarca nigromarginata*, *M. subquadrata* and *M. faba* Pfeffer, in Martens & Pfeffer, 1886; and *M. crassa*, *M. lecannelieri*, *M. lephayi*, *M. savatieri*, *M. fuegiensis*, *M. sauvineti* and *M. hahni* Rochebrune & Mabille, 1889. But the new species differs from *G. trapesina* by the following characters: a poorly-marked rostrum (always well-developed in *G. trapesina*), the cardinal teeth (very inconspicuous in *G. trapesina*), and the relative length of the three mantle openings. In *G. trapesina* the two ventral openings are subequal and separated by a suture longer than either; the anal opening is smaller (half the length of the other two openings). Other less diagnostic characters are the size of the foot (less developed in *G. bahamondei*), the color of the shell (salmon red as opposed to yellowish, brown or purplish brown in *G. trapesina*), and the habitat (*G. trapesina* being epibiotic on the large kelp *Macrocystis pyrifera*).

Gaimardia exilis Philippi was described without illustration, and we failed to trace the type material. At this stage, its true nature must be questioned, but according

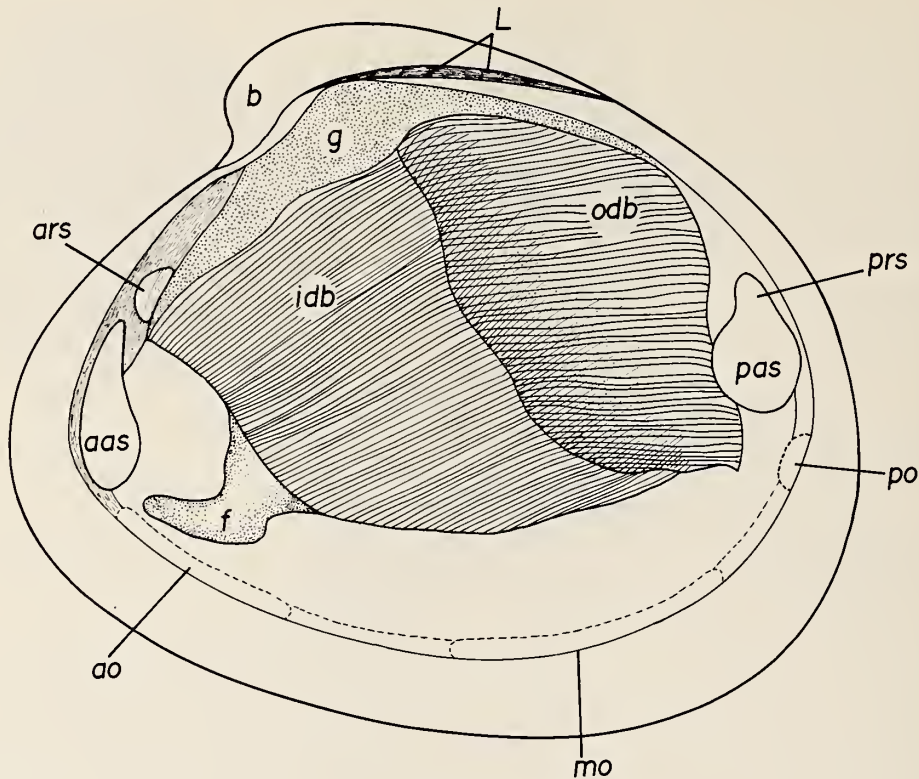


Figure 4

Gaimardia bahamondei Osorio & Arnaud, spec. nov., with left valve removed. aas, anterior adductor scar; ao, anterior (or pedal) opening; ars, anterior retractor scar; b, beak; f, foot; g, gonad; idb, gill inner demibranch; L, ligament; mo, median (or branchial) opening; odb, gill outer demibranch; pas, posterior adductor scar; po, posterior (or anal) opening; prs, posterior retractor scar.

to the description, this is neither *G. adamsiorum* nom. nov., nor *G. bahamondei* spec. nov.

Other related species, originally described in the genus *Modiolarca*, are *G. mesembrina* (Melvill & Standen, 1907)

and its synonym *M. picturata* Cooper & Preston, 1910; *M. gemma* Cooper & Preston, 1910; and *M. bennetti* Preston, 1913. The taxonomic status of these species is unclear; there are probably some other synonyms among them, and some will probably have to be referred to *Kidderia* Dall, 1886 (in the subfamily Cyamiinae of the family Cyamiidae *sensu* PONDER, 1971) instead of *Gaimardia*. We disagree with BERNARD (1983) who lists the first three names as additional synonyms of *G. trapesina*. In any event, we consider that the elongate shape, the color, and the hinges (when they are known) distinguish these species sufficiently from our Chilean material.

Finally, *G. kerguelensis* (Smith, 1885), known only from the type locality (Kerguelen Islands, south Indian Ocean), also has a very different elongate shape, and other characters showing no close affinities with the material from Isla Santa Maria.

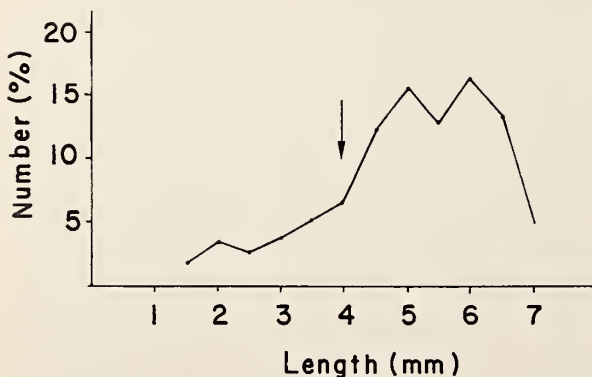


Figure 5

Gaimardia bahamondei Osorio & Arnaud, spec. nov. Population structure according to size (arrow indicates minimum size at maturity).

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